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PATENT REQUEST: STANDARD PATENT/PATENT OF ADDITION

I, being the person identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Full application details follow.

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[54] Invention Title: SAFETY BARRIER NETTING

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ASSOCIATED PROVISIONAL APPLICATION(S) DETAILS

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BEAUMONT GREGORY LYONS

By: 

Registered Patent Attorney

TO: THE COMMISSIONER OF PATENTS
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AUSTRALIA

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NOTICE OF ENTITLEMENT

I, BEAUMONT GREGORY LYONS of Majors Creek Road, Woodstock, Queensland, 4816, Australia being the applicant in respect of the attached Application relating to PK 9433, state the following:-

The person nominated for the grant of the patent:
is the actual inventor

The person nominated for the grant of the patent:
is the applicant of the provisional application listed on the patent request form

BEAUMONT GREGORY LYONS
By his Patent Attorneys

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Date: 12 October 1992



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SAFETY BARRIER NETTING

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(57)

An inexpensive safety barrier netting formed from a flexible sheet material which has been slitted to produce a formation of two repeating polygonal shaped openings (20,21) when expanded by tensioning opposite edges (12,13). The slitting comprises four arrays; a first (11) and second (14) array of overlapping longitudinal slits and a third (16) and fourth (17) array of transverse slits. The third array of slits connects the mid-section region of adjacent slits comprising the first array. The fourth array of slits connects the mid section region of adjacent slits comprising the third and sixth recurring pair of slits in the second array.

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION
FOR A STANDARD PATENT

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Invention Title: SAFETY BARRIER NETTING

Details of Associated Provisional Applications: Nos. PK 9433 -
13.11.91

The following statement is a full description of this invention,
including the best method of performing it known to me:

THIS INVENTION relates to netting and is particularly concerned with netting for use in demarcating areas which are out of bounds to the public. Although the netting has other uses and is therefore not to be construed as being limited to this particular application, it has been developed primarily to meet the need imposed by various Governmental bodies, such as local councils, to provide a visible warning/safety barrier around construction sites, excavations, road works and other places where the public is not permitted to enter; and it will therefore be described in this context.

Netting in use around construction and like sites is typically made from welded strips of red or orange coloured plastics material. Such netting is expensive to produce because of the number of process steps required to produce the final welded configuration.

In order to minimise such costs, it has been proposed to use netting formed from sheet plastics material having a series of parallel overlapping longitudinal slits, such as disclosed in Australian Patent Application No. 70922/91. However, the problem with such netting is that the netting pattern only forms when the product is in an untensioned state and it is not therefore possible to provide an effective vertical barrier.

Since a prime requirement of temporary warning/safety of barriers is their ability to allow wind to blow through them - thereby obviating the necessity to provide strong rigid supports - it has also been proposed to form barriers from sheet plastics materials which have circular or

like shaped holes cut in them. However, such products are wasteful of material in that the cut out portion is of no use and is discarded. Furthermore, the sheets are not expandable transversely, which can be unduly limiting in some uses and also adds extra cost to the barrier in that the sheet must be manufactured in the same size as the barrier.

It is therefore an object of the present invention to provide a netting which is less expensive, per square metre of useable netting, to produce than the aforementioned nettings.

It is a further object of the invention to provide a netting formed from sheet material which produces a netting pattern in a tensioned state.

It is a still further object of the invention to provide a netting which allows wind passaging and is not wasteful of material in its production.

These objects of the invention are met by the provision of a netting formed from a rectangular sheet of flexible material having a thickness of between 20 and 500 μm , said sheet having a multiplicity of slits formed therein comprising four arrays:-

(i) a first array of slits of between 1 and 50 centimetres in length arranged to extend from one edge of the sheet to the opposite edge in substantially parallel spaced alignment with respect to the sheet edge,

(ii) a second array of slits of between 1 and 50 centimetres in length arranged similarly to said first array but overlapping said first array so as to produce a transverse spacing between adjacent slits in the first and second arrays

of between 2 and 20 millimetres,

(iii) a third array of slits extending at right angles to said first array and connecting the mid-section region of adjacent slits comprising the first and fourth recurring pair of slits of said first array, and

(iv) a fourth array of slits extending at right angles to said second array and connecting the mid-section region of adjacent slits comprising the third and sixth recurring pair of slits of said second array.

The sheet of flexible material from which the netting is fabricated can be selected from a wide range of materials including paper, natural and artificial rubber, plastics materials, laminates of these materials, and composites. Preferred materials are plastics materials such as polyethylene, polypropylene, polyvinylchloride, polysulfone, polybutylene and polyvinylethylether; with the most preferred being high density polyethylene.

The particular thickness of the sheet of flexible material will be selected according to the type of material to be used and the intended end use of the product. The preferred thickness for polyethylene used in construction site barriers will be about 120 microns. When such sheeting is formed with the arrays of slits according to the present invention, the sheets are expandable transversely by up to several times the original sheet width, thereby providing a large surface area and effective visible barrier. Thus, for barriers of say two metres in height, an unexpanded sheet width of some 0.5 metres may be all that is required to produce the netting, thus giving significant cost savings not

only over the welded type plastic barriers formed from sheeting which has simply had holes formed therein.

5 For safety barriers, the first and second array of longitudinal slits will, in most instances, be of the order of 3 to 5 centimetres in length and the separation between adjacent slits will be about 5 - 10 millimetres.

Most suitably, the second array of slits will overlap the first array of slits by from 10 to 30% of the length of the slits in the first array.

10 The arrays of slits result in the formation of two repeating polygonal shaped openings in the sheet material when it is expanded by tensioning opposite edges. Such openings comprise more than 75% of the surface area of the netting and thus permit the passage of wind through the netting while
15 still providing a highly visible product.

Because the netting has its prime application as a safety barrier, it will generally incorporate a colourant therein. Such a colourant will typically be a red or orange pigment of the type generally employed for this purpose.

20 However, as mentioned at the outset, the netting can have other uses besides being a safety barrier. Thus, it could be used as an anti-bird netting on horticultural crops and on fish farming ponds, or as an insect deterrent from vegetable and fruit crops. In these contexts, colourants can
25 be incorporated into the netting, such as silver or white colourants which are known to repel aphids and white fly.

Additionally, animal repellents could be incorporated into the netting during the manufacture of the material itself. An example of a non-toxic and

environmentally acceptable repellent is SAVANA which is manufactured by The Savana Company, California, U.S.A. This product has an odour and taste which repels a wide range of animals without adversely affecting them.

5 Another usage for the netting is in packaging, such as wrapping pallets, or in containing hay bales.

10 The netting may be produced by conventional techniques such as by passing the sheet of flexible material over a plurality of primary blades in a spaced off-set configuration with respect to one another, so as to produce the first and second arrays of longitudinal slits, and then passing the thus slitted sheet over a plurality of secondary blades in parallel spaced alignment with one another, so as to produce the third and fourth arrays of transverse slits. 15 Suitably, the sheet of flexible material is slit as it is unrolled from a continuous roll and is then immediately wound onto a take-up spool. The take-up spool is preferably connected to a motor through a reduction gearbox, and provides the driving means for the sheet of flexible material to be unwound and then re-wound again. 20

25 The blades may be arranged in any fashion to achieve the desired end result. They are preferably arranged to rotate into and out of the flexible sheet material and are suitably located on a plurality of discs which rotate about a common shaft beneath the passing sheet of flexible material. The discs are preferably arranged to rotate faster than the speed of the sheet of flexible material to ensure that effective slitting is achieved.

The unique arrays of slits in the sheeting material

enables a netting to form in a tensioned state, thereby providing a high strength yet visible product, which permits the free flow of wind therethrough.

5 A preferred embodiment of the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a plan view of a portion of the unexpended netting according to the present invention;

10 Figure 2 is a plan view of the netting depicted in Figure 1 which has been expanded; and

15 Figure 3 is a close-up perspective view of a section of the expanded netting depicted in Figure 2.

In all the drawings, like reference numerals refer to like parts.

20 Referring firstly to Figure 1, the netting comprises a high density polyethylene sheet 10 having a thickness of 40 μ m with four arrays of slits. The first array 11 comprises slits of approximately 4.5 cm in length which extend in parallel alignment from a top edge 12 of the sheet to the bottom edge 13 of the sheet. The second array 14 of slits, also of approximately 4.5 cm in length, extends in a similar pattern from one edge of the sheet to the other, and overlaps between adjacent pairs of the first array by about 1.5 cm. The second array, however, omits a central slit so that the mid-longitudinal region 15 of the netting is provided with extra strength at this location for the purpose of tensioning the netting.

25 The third array 16 and fourth array 17 of slits extend transversely of the sheet and connect the mid section

regions of the slits in the first and second arrays. These slits are approximately 1.5 cm in length.

The netting thus formed is produced by rotary disc cutters of the type described in Australian Patent Specification 70922/91.

Figure 2 depicts the netting which has been stretched transversely in the direction of the heavy arrows so as to increase its transverse dimension by about 50%. This produces a formation of two repeating polygonal shaped openings 20, 21. It will be noted that these openings comprise a major region of the netting and therefore permit significant wind passaging from one side to the other while still providing a highly visible barrier by virtue of the multiplicity of solid horizontal regions 22 between the rows of openings, the mid-longitudinal region 15, and solid edge portions 23, 24.

Figure 3 illustrates polygonal opening 21 in close-up. It will be observed that tensioning of the sheet plastics material results in the walls 30 defining the perimeter of the opening, assuming an almost perpendicular orientation with respect to the plane of the netting.

The netting thus described is inexpensive in content and manufacture, and meets the requirement of Governmental bodies for visible safety barriers.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A netting formed from a rectangular sheet of flexible material having a thickness of between 20 and 500 μ m, said sheet having a multiplicity of slits formed therein comprising four arrays:-

(i) a first array of slits of between 1 and 50 centimetres in length arranged to extend from one edge of the sheet to the opposite edge in substantially parallel spaced alignment with respect to the sheet edge,

(ii) a second array of slits of between 1 and 50 centimetres in length arranged similarly to said first array but overlapping said first array so as to produce a transverse spacing between adjacent slits in the first and second arrays of between 2 and 20 millimetres,

(iii) a third array of slits extending at right angles to said first array and connecting the mid-section region of adjacent slits comprising the first and fourth recurring pair of slits of said first array, and

(iv) a fourth array of slits extending at right angles to said second array and connecting the mid-section region of adjacent slits comprising the third and sixth recurring pair of slits of said second array.

2. A netting as claimed in claim 1, wherein said netting is formed from paper or plastics material.

3. A netting as claimed in claim 1, wherein said netting is formed from a material selected from the group consisting of polyethylene, polypropylene, polyvinylchloride, polysulfone, polybutylene and polyvinylethylether.

4. A netting as claimed in claim 1, wherein the length

of the slits in the first and second arrays is between 3 and 5 centimetres.

5. A netting as claimed in claim 1, wherein the length of the slits in the third and fourth arrays is between 5 and 10 millimetres.

6. A netting as claimed in claim 1, wherein said second array of slits overlaps said first array of slits by from 10 to 30% of the length of the slits in the first array.

7. A netting as claimed in claim 1, which is expandable in transverse direction by at least four times the width of the netting when in an unexpanded state.

8. A netting as claimed in claim 1, which includes a colorant therein.

9. A netting substantially as herein described with reference to the accompanying drawings.

DATED this 14th day of October 1992

BEAUMONT GREGORY LYONS

By his Patent Attorneys

CULLEN & CO.

ABSTRACT

An inexpensive safety barrier netting formed from a flexible sheet material which has been slitted to produce a formation of two repeating polygonal shaped openings (20,21) when expanded by tensioning opposite edges (12,13). The slitting comprises four arrays; a first (11) and second (14) array of overlapping longitudinal slits and a third (16) and fourth (17) array of transverse slits. The third array of slits connects the mid-section region of adjacent slits comprising the first array. The fourth array of slits connects the mid section region of adjacent slits comprising the third and sixth recurring pair of slits in the second array.

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